Understanding and Developing Applications for Maemo Platform

Speaker:

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About me

PhD candidate at Federal University of Campina Grande, Paraiba, Brazil; Professor in Computer Science at Federal University of Alagoas

Have been working for embedded systems:

- Location Based System
- Universal Plug and Play
- Mobile Payment
- VoIP, DCCP protocol and Linux Kernel
- Maemo PC-Connectivity

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Summary

- **Introduction**

- **Maemo timeline**

- **Maemo development**

- **Examples & Applications**

- **Conclusion**

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Intro: What is maemo platform?

- Maemo is a software platform developed by Nokia for smartphones and Internet Tablets
- Based on the Linux
- Maemo is mostly based on open source code with many open source projects such as the Linux kernel, GTK and Qt

Nokia 770

Nokia N800

Nokia N810

Nokia N900

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Intro: presentation goal

- Provide to the attendees the current maemo state-of-art in terms of development tools for maemo platform

- **Expected result:** allow attendees to become able to develop their own maemo applications and also introduce the next step of a near future: the MeeGo platform.

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Maemo timeline: Nokia 770

- **1st version**: November, 2005
- OS2005 – v1.1; OS2006 - v2.0-2
- Processor: 252Mhz TI-OMAP
- Memory: 64MB RAM, 128MB Flash
- Bluetooth and IEEE 802.11g
- Display: 800x600 4.13in diagonal
- Tools:
  - Opera web browser
  - Flash 6
  - E-Mail & RSS
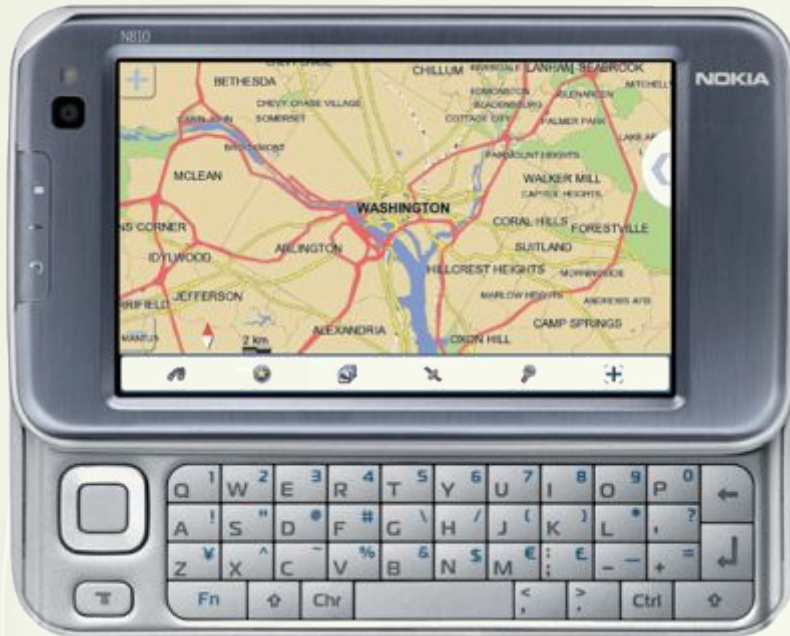 - PDF reader
  - Music & video player

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Maemo timeline: Nokia n800

- **2st version**: January, 2007
- OS2007 – v3.0-2; OS2008 - v4.0-1
- Processor: 330-400Mhz TI-OMAP
- Memory: 128MB RAM, 64GB Flash
- Bluetooth, IEEE 802.11g & USB 2.0
- Two slots SD (micro/mini)SD, MMC
- Tools:
  - Mozilla-based Micro-B browser
  - Flash 7
  - E-Mail & RSS
  - PDF reader
  - Music & video player
  - Camera 640x480 VGA
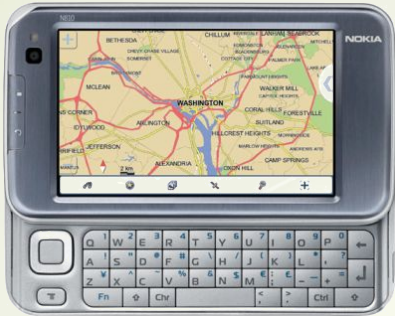 - Gizmo / Skype
  - FM Radio Tuner

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Maemo timeline: Nokia n810

- **3st version**: October, 2007
- OS2008 - v4.0-1
- Processor: 400Mhz TI-OMAP 2420
- Memory: 128MB RAM, 64GB Flash
- Storage: 256MB + 2GB Flash
- Bluetooth 2.0, IEEE 802.11g & USB 2.0
- Two slots SD (micro/mini)SD, MMC
- WiMax Edition
  - April, 2008
  - Production canceled in Jan, 2009

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Maemo timeline: Nokia n810

Major changes from N800

- Sliding, backlit keyboard
- Front-facing webcam (replacing pop-out rotating device)
- Ambient Light Sensor
- Integrated GPS
- No longer has an FM tuner

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Maemo timeline: Nokia n900

- **4st version**: November, 2009
- Maemo 5 Linux
- Processor: 600Mhz TI-OMAP 3430 Cortex A8
- Memory: 256MB RAM, 768 Swap space
- Storage: 256MB + 32GB eMMC Flash
- Bluetooth 2.1, IEEE 802.11g & USB 2.0
- One slot microSD microSDHC
- Tools:
  - Mozilla-based Micro-B browser
  - Flash 9.4 & RSS
  - Phone Application
  - VoIP: SIP, Skype, GTalk
  - OVI Maps

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Maemo timeline: Nokia n900

- **Major changes from N810**
  - New user interface with multiples environments support
  - Graphics: PowerVR SGX 530 GPU with OpenGL ES 2.0
  - Camera: 5.0MP, Carl Zeiss Tessar lens (rear camera)
    0.3MP (640×480) (front camera)
  - Connectivity: GSM 850/900/1800/1900
    GPRS 107/64 kbps DL/UL
    EDGE 296/178 kbps DL/UL
    UMTS 900/1700/2100
    WCDMA 384/384 kbps DL/UL
    HSPA 10/2 Mbps DL/UL
    Bluetooth 2.1
    FM receiver / Transmitter
    Infrared transceiver
  - Battery: 1320 mAh and 2400mAh

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Maemo timeline: maemo + moblin = MeeGo
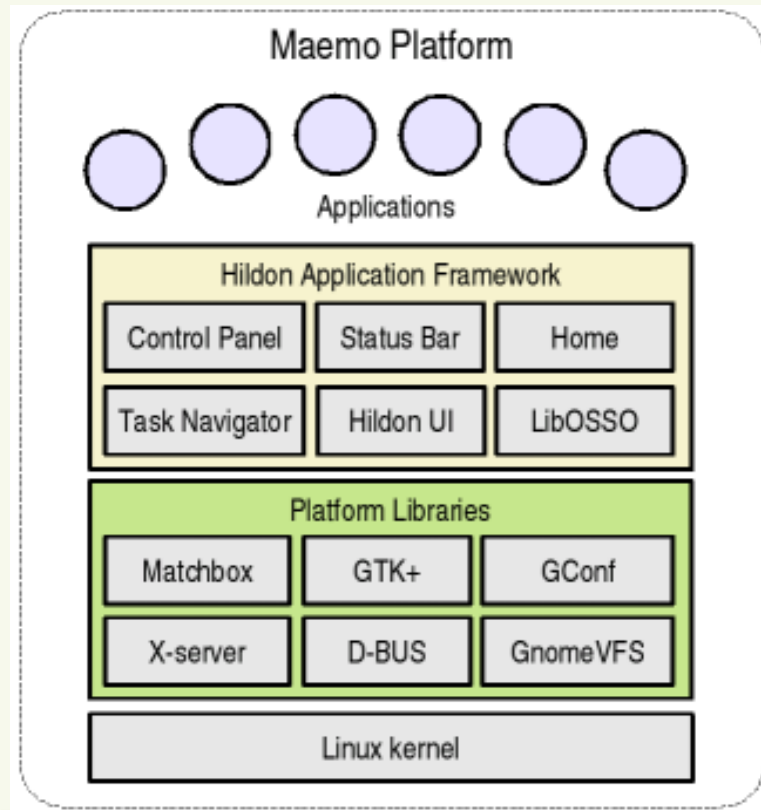
5th version: May, 2010?

Maemo Plataform – Architecture

- Based on open source components

  - Linux
  - Hildon
  - LibOSSO
  - GTK+
  - D-BUS
  - Qt
  - Bluez
  - Gstreamer
  - ...

Maemo development

- Development is similar to Desktop

- A subset of Linux libraries ported to maemo

- Virtual environment based on *Scratchbox*
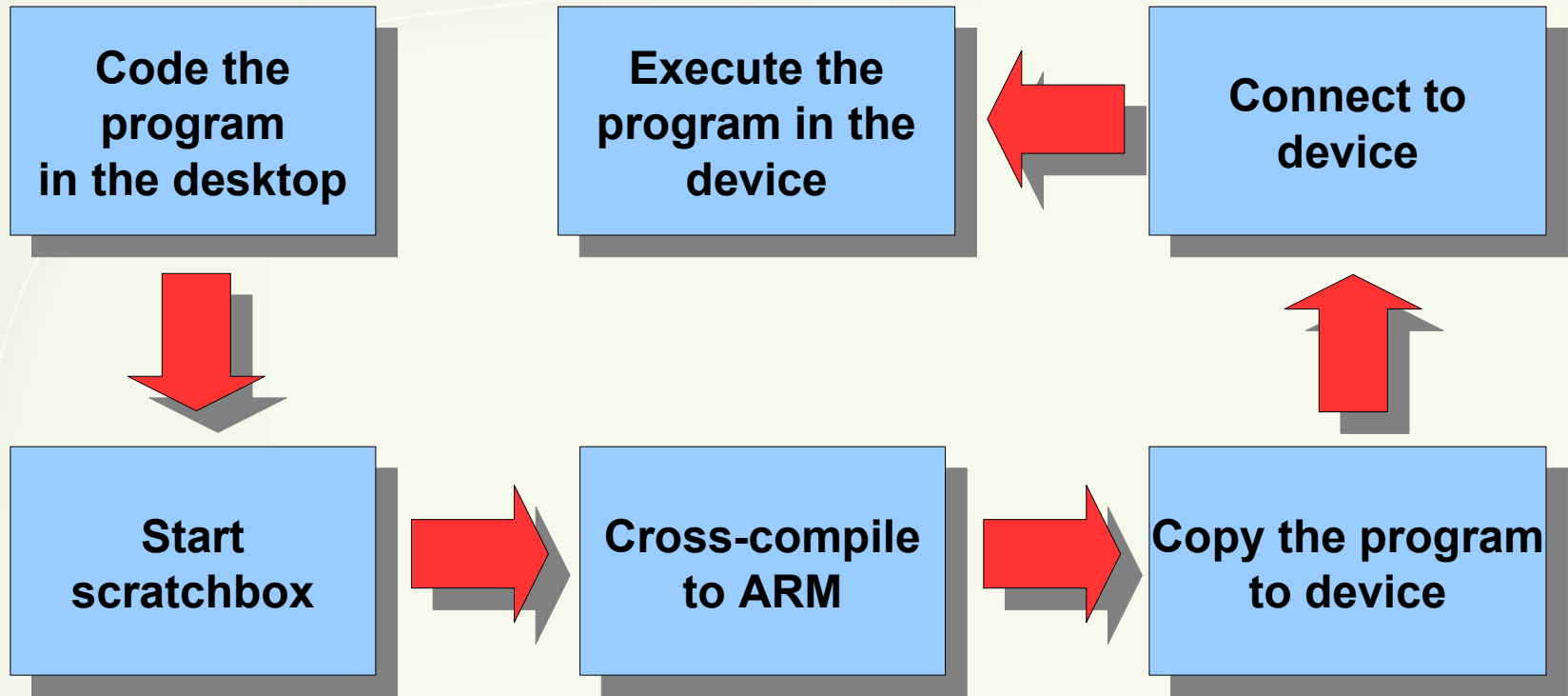
- GNU Toolkit (gcc, gdb, make, autotools, …)

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Maemo development

Supported programming languages

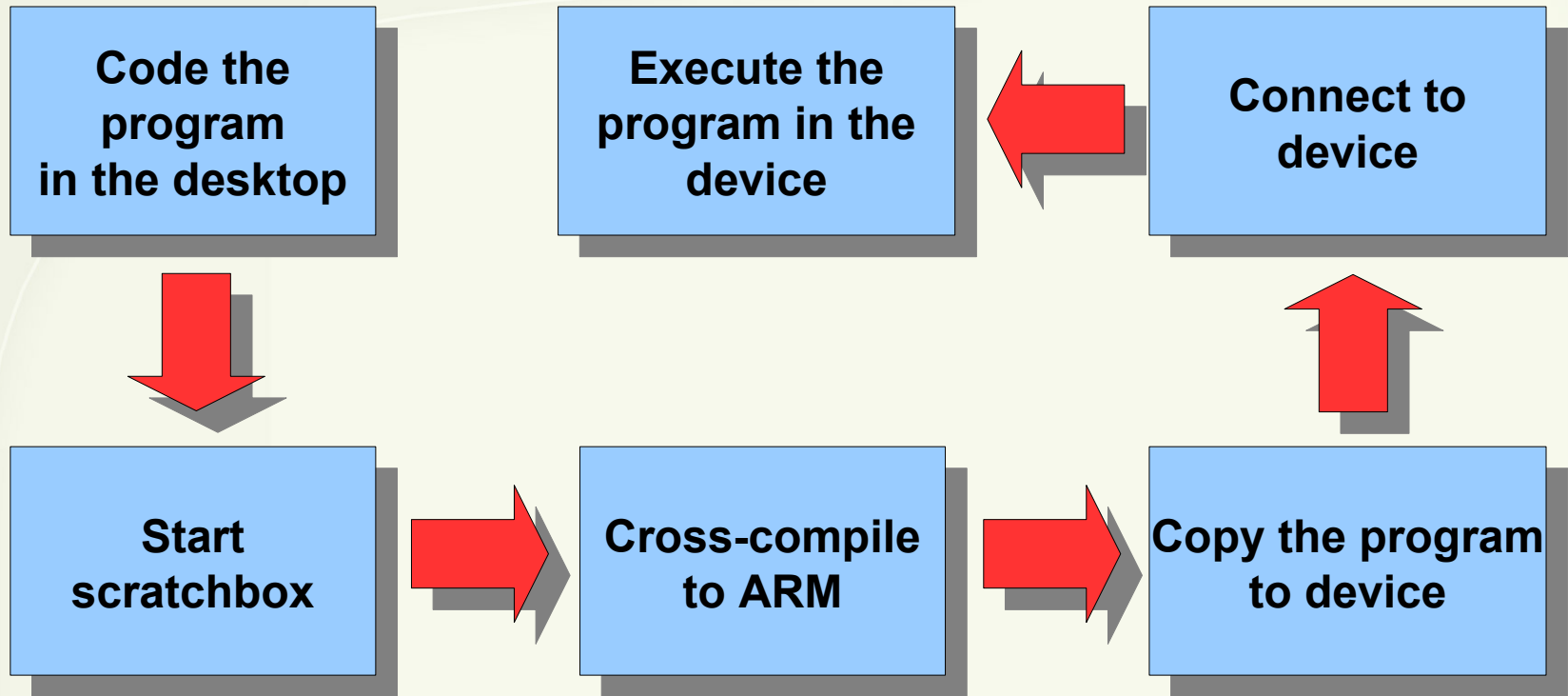- Shell scripts (remember, it is Linux!)

- C / C++ / Qt

- Python

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Maemo development - C / C++

Code the program in the desktop → **Start scratchbox** → **Cross-compile to ARM** → **Copy the program to device** → **Connect to device** → **Execute the program in the device**

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Maemo development - Python

- Alternative to C / C++

- Simple and easy to learn

- No need of scratchbox

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Maemo development - C / C++

```
Code the
program
in the desktop
```

→

```
Start
scratchbox
```
→
```
Cross-compile
to ARM
```
→
```
Copy the program
to device
```
↑
```
Connect to
device
```
←
```
Execute the
program in the
device
```

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Maemo development - Python

```
┌──────────────────┐        ┌──────────────────┐        ┌──────────────────┐
│   Code the       │        │  Execute the     │  ◄──   │   Connect to     │
│   program        │        │  program in the  │        │   device         │
│   in the desktop │        │  device          │        │                  │
└──────────────────┘        └──────────────────┘        └──────────────────┘
         │                                                        ▲
         └────────────────────────────────────►          ┌──────────────────┐
                                                          │  Copy the program│
                                                          │  to device       │
                                                          └──────────────────┘
```

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Maemo development - Python

| Connect to device | → | Code in the device | → | Execute the program |

The development of applications
for mobile devices is becoming more simple

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Maemo development - Tools

- Scratchbox + vi

- Maemo PC-Connectivity (MPC)
  http://pc-connectivity.garage.maemo.org/2nd_edition/index.html

- IDE Integration / ESBox / PluThon
  http://maemo.org/development/documentation/ide_integration

- Qt Creator
  http://qt.nokia.com/products/developer-tools

- Maemo Application Development and Debugging Environment (MADDE)
  http://wiki.maemo.org/MADDE

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Maemo development - Tools

Scratchbox + maemo sdk
- The basic maemo development environment
- It allows compilation in C and C++
- It provides python VM
- See example…

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Maemo development - Tools

Maemo PC Connectivity (MPC)

- The default maemo development environment consists of two parts:
  - The host PC environment with a maemo SDK installation
  - Tablet (device)
- Components are usually developed as far as possible using the maemo SDK (on the host PC)
- Only after everything seems to function is testing done with the true Tablet environment
- It must be easy to run, test and debug components using the Tablet

  http://maemo.org/development/documentation/pc_connectivity/

  http://pc-connectivity.garage.maemo.org/2nd_edition/index.html

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Maemo development - Tools

IDE Integration / ESBox

- ESbox is an Eclipse-based product that helps programmers to develop applications for Maemo platform using Scratchbox

- It supports C/C++ and Python programming languages with source editing, code completion, build, launch, debug, profiling, and packaging support

  http://esbox.garage.maemo.org/

Maemo development - Tools

IDE Integration / ESBox (contd.)

Maemo development - Tools

IDE Integration / ESBox (contd.)

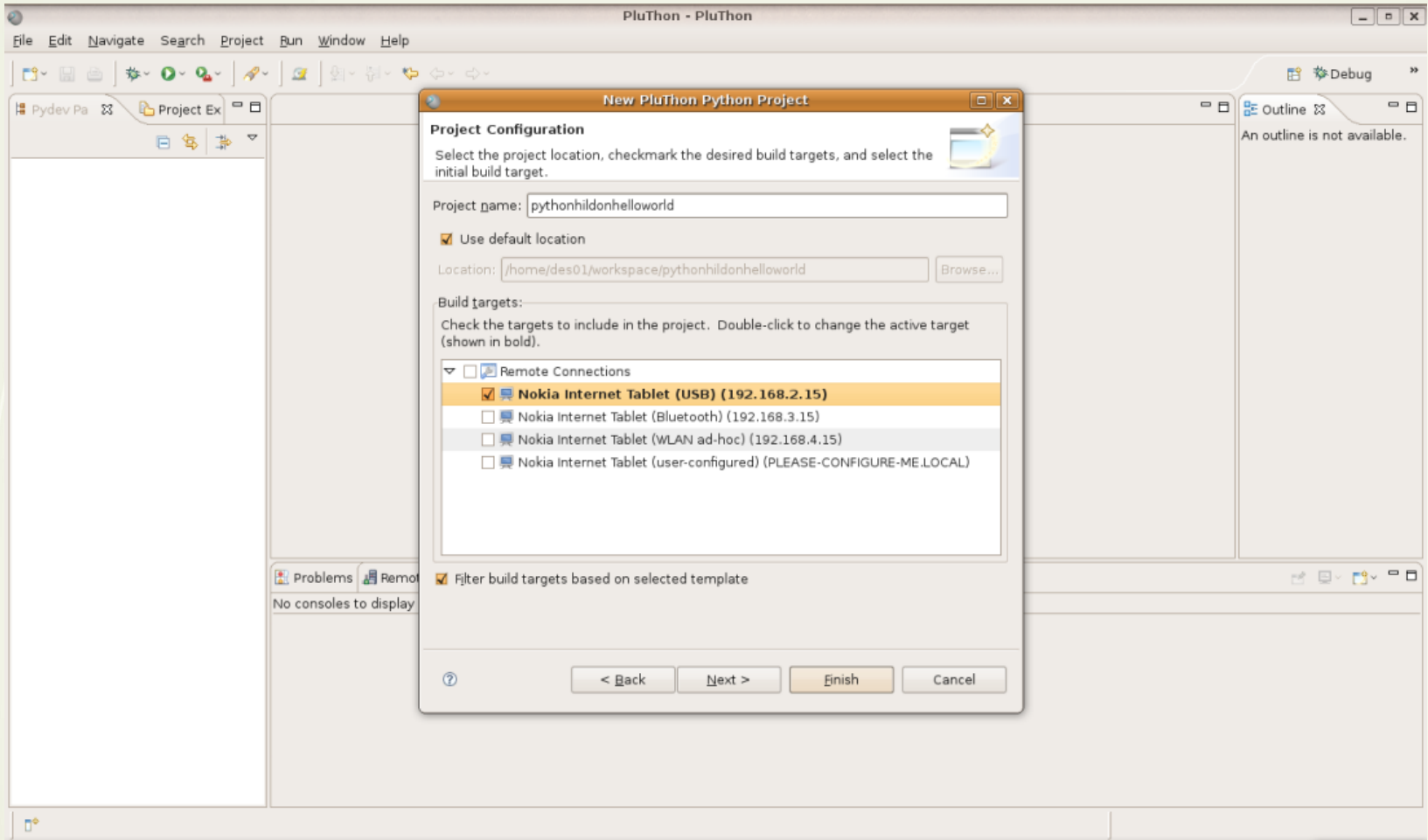# Maemo development - Tools

IDE Integration / PluThon

- PluThon is an Eclipse based product that provides support for developing Python applications for maemo
- It does NOT require Scratchbox
- Developers run and debug applications directly on a maemo device, speeding up the development time

  http://pluthon.garage.maemo.org/

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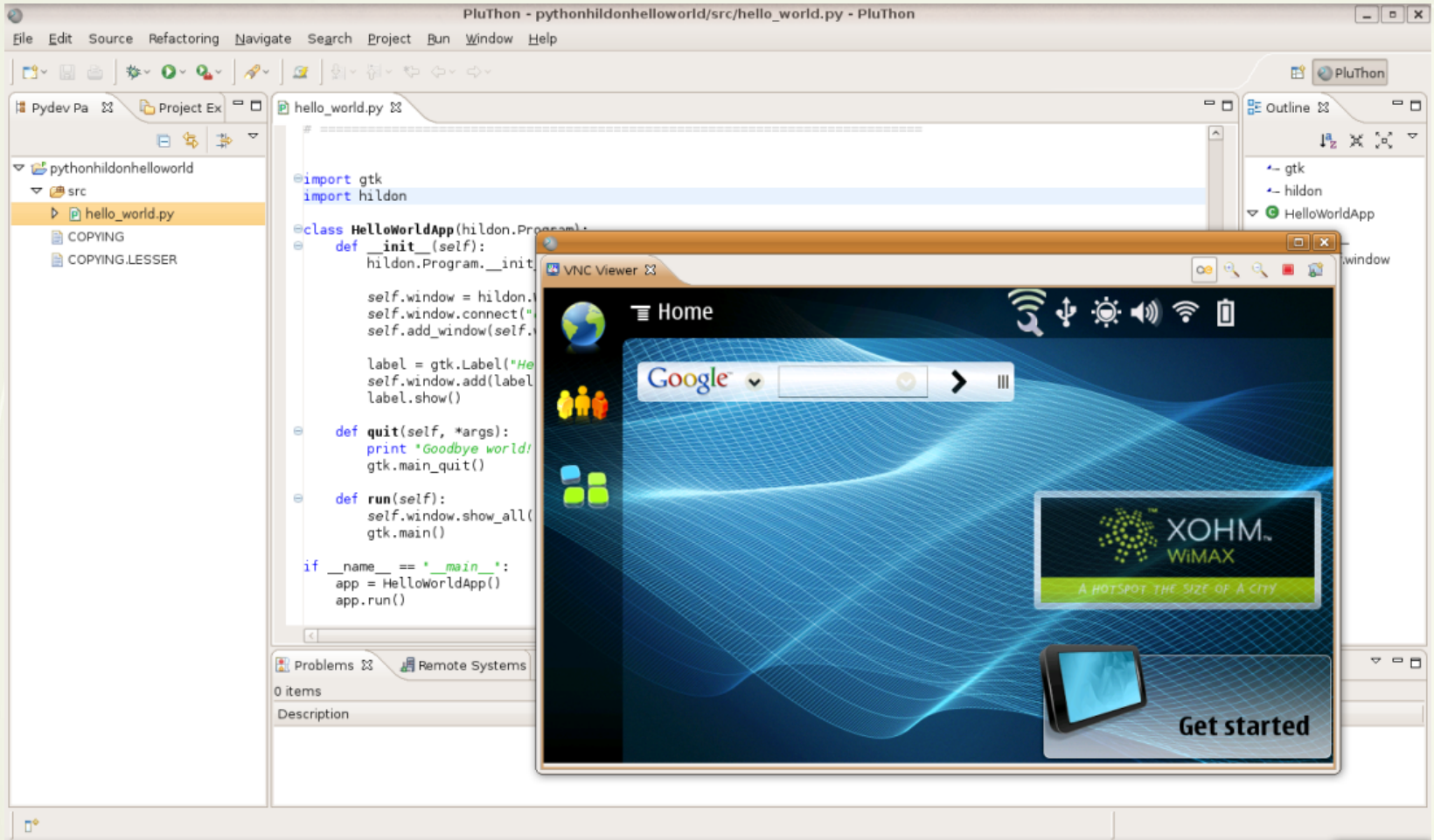
Maemo development - Tools
IDE Integration / PluThon (contd.)

Maemo development - Tools
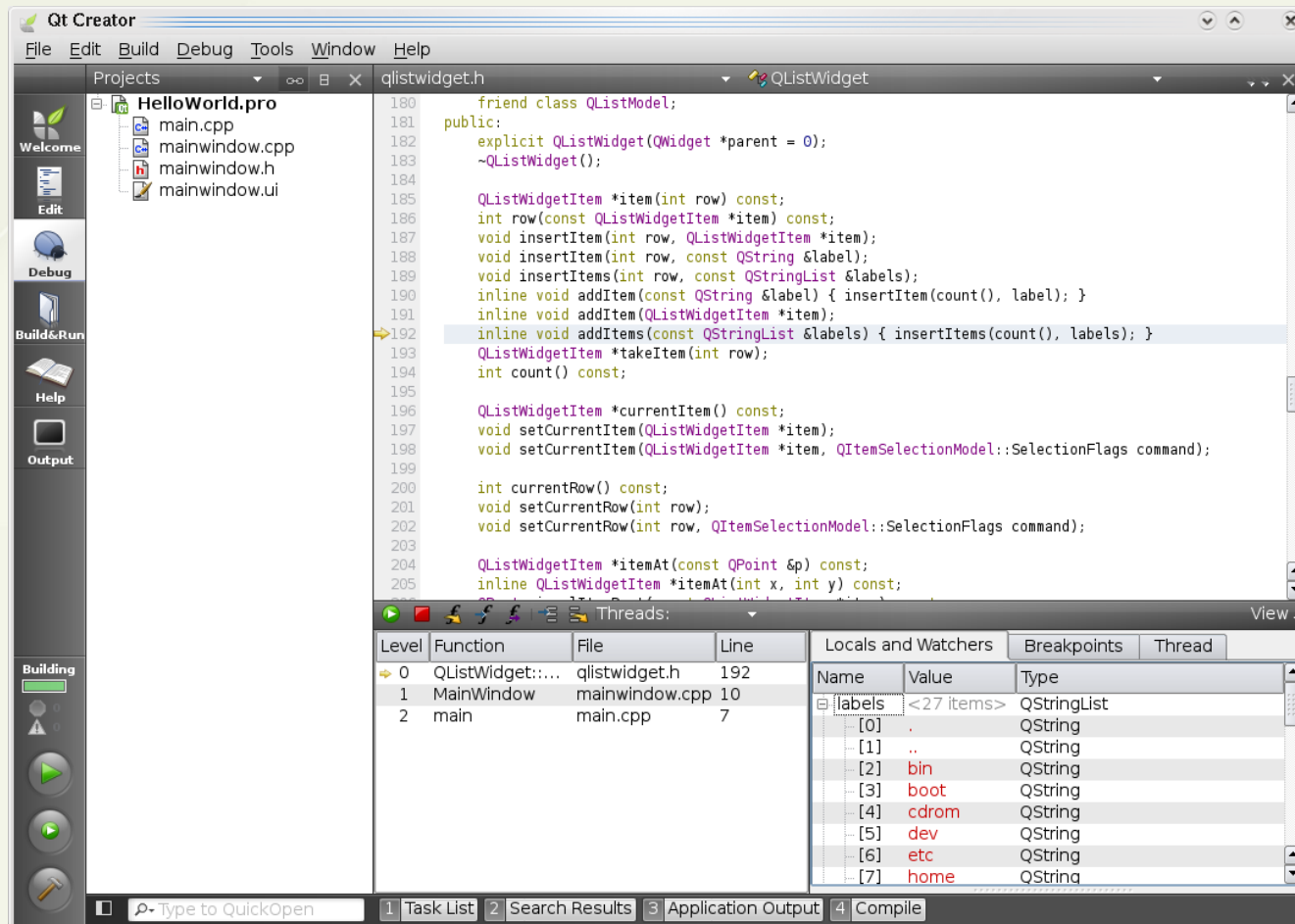
IDE Integration / PluThon (contd.)

Maemo development - Tools

Qt Creator

– Cross-platform integrated development environment (IDE) for developing Qt applications

– It provides:

- An advanced C++ code editor
- Integrated GUI layout and forms designer
- Project and build management tools
- Integrated, context-sensitive help system
- Visual debugger
- Rapid code navigation tools
- Supports multiple platforms
- Recent/preliminary support for Symbian platform
- Support for maemo platform through MADDE

– http://qt.nokia.com/products/developer-tools

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Maemo development - Tools

QtCreator (contd.)

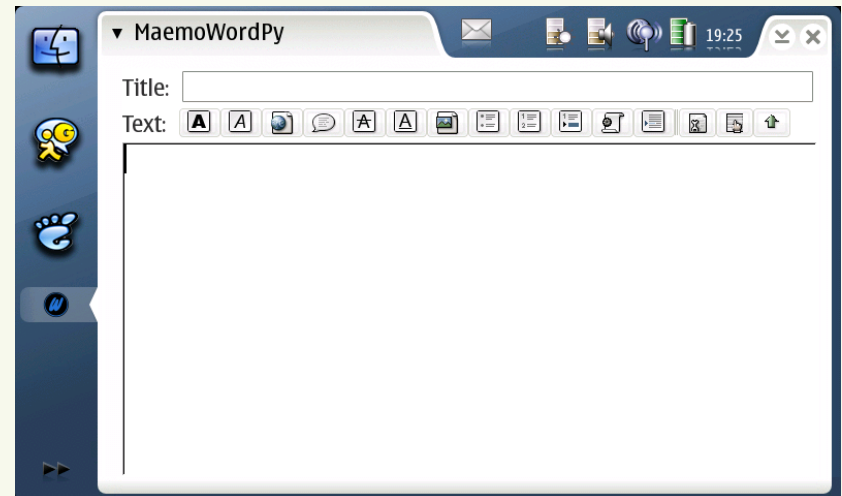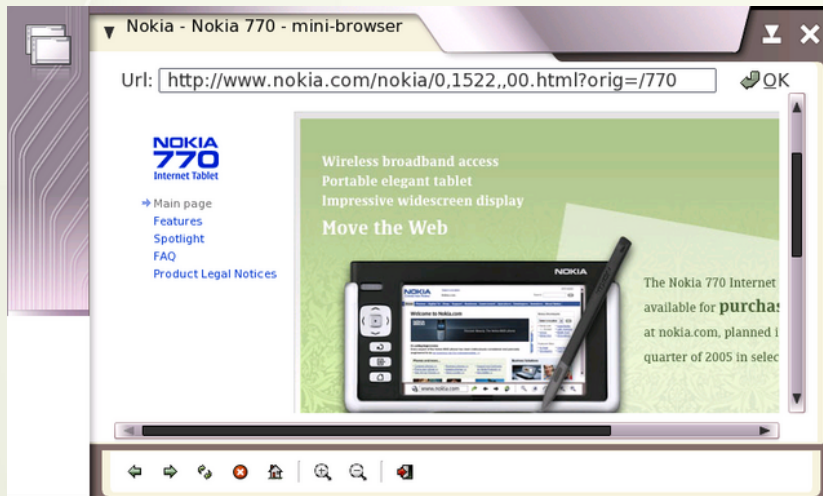# **Maemo development** - Tools

MADDE

- **M**aemo **A**pplication **D**evelopment and **D**ebugging **E**nvironment
- It is in technical preview status
- It provides:
  - Command-line cross-compiling
  - Multi-platform support (Linux (32-bit/64-bit), Windows, Mac OS X)
  - Configurable for different targets & toolchains
  - Client for the device to simplify the development process
- It will [probably] become part of the development environment for MeeGo
- http://wiki.maemo.org/MADDE

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Maemo development - Libraries

Hildon

- A *framework* for developing GUIs
- Provides a set of dialogs, widgets and themes based on GTK

Maemo development - Libraries

LibOSSO

- Access some system and device functions
- Date/time management
- Display management (turn on/off)
- Battery level
- Auto-saving / state-saving
- Notification dialogs

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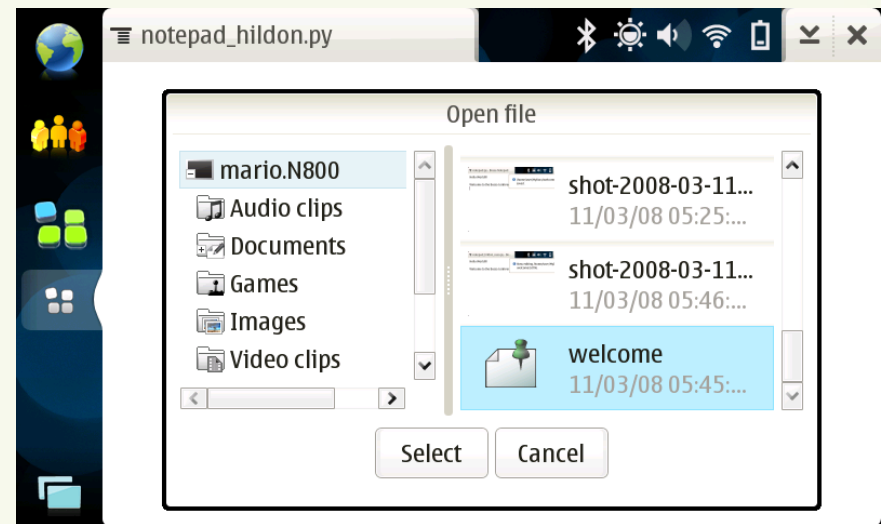# Let's go to examples...

```
1   # Create application menu
2   menu = gtk.Menu()
3   items = [gtk.MenuItem("Open..."),
4          gtk.MenuItem("Save"),
5          gtk.MenuItem("Exit")]
6
7   # List of callbacks to handle menu events
8   callbacks = [self.open, self.save, self.exit]
9
10  # Connecting callbacks to each items of the menu
11  for i in range(len(items)):
12      items[i].connect("activate", callbacks[i])
13      menu.append(items[i])
14
15  # Set the menu of the window
16  self.window.set_menu(menu)
```

Let's go to examples... (contd.)

```
1   # Open existing file
2   def open(self, widget, *args):
3     # Create a file chooser dialog to select which file to open
4     dlg = hildon.FileChooserDialog(self.window,
5             gtk.FILE_CHOOSER_ACTION_OPEN)
6     response = dlg.run()
7     # If the user clicked in ok, we get the selected filename, get
8     # the content of the selected file and put it into the textbuffer
9     # of the textview object
10    if response == gtk.RESPONSE_OK:
11      self.filename = dlg.get_filename()
12      infile = open(self.filename, 'r')
13      if infile:
14        string = infile.read()
15        self.textbuffer.set_text(string)
16        infile.close()
17    dlg.destroy()
```
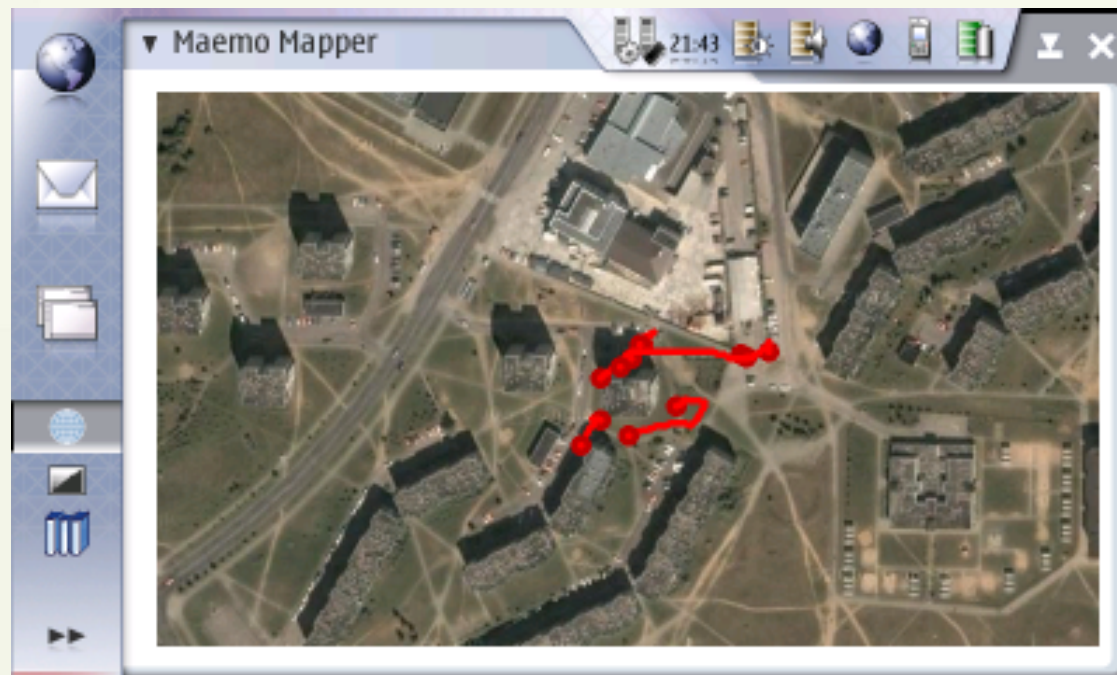
Let's go to examples... (contd.)

```
1  # This function creates a libOSSO info_print object
2  # and shows it, returning the result
3  def show_infoprint(obj_name, message):
4      osso_c = osso.Context(obj_name, "0.0.1", False)
5      note = osso.SystemNote(osso_c)
6      note.system_note_infoprint(message)
```
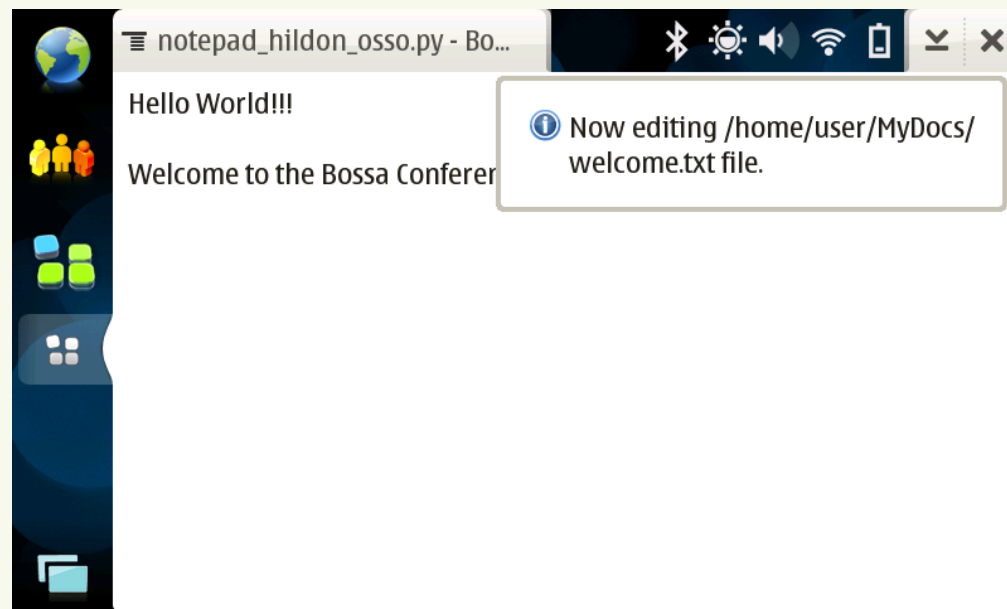
Examples of complete apps / libs

LibGPSBt – provides API to get access to the geographical coordinates

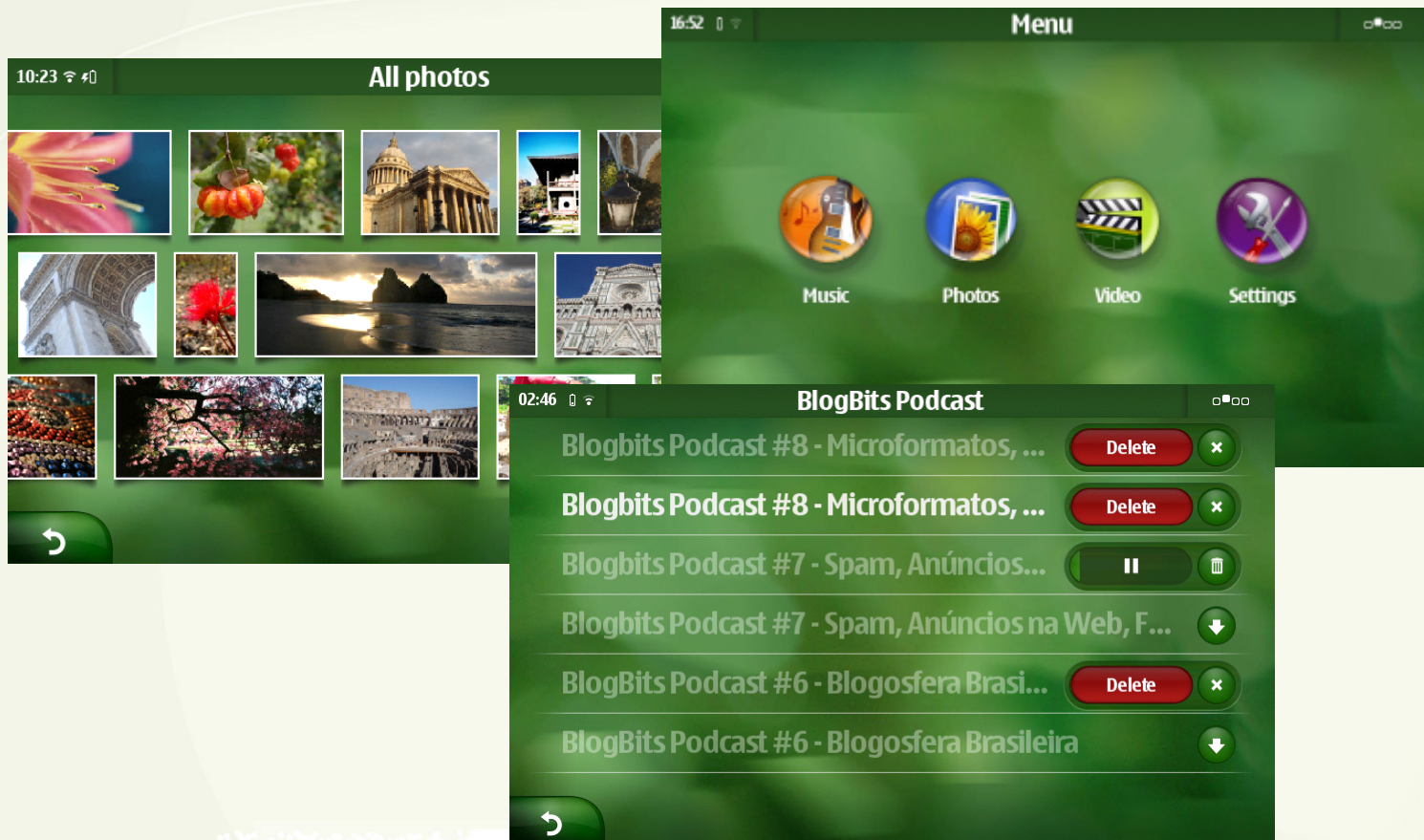**Leandro Melo de Sales, Msc**
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Examples of complete apps / libs

Carman – application to get information from cars through bluetooth: velocity, engine rotation, fuel level, …

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Examples of complete apps / libs

Canola – multimedia player

Next step: MeeGo Platform

- **MeeGo is an open source, Linux project which brings together**
  - Moblin project, by Intel
  - Maemo project, by Nokia
- Integration between them into a single open source activity ➜ integrates the experience and skills of two significant development ecosystems
- Many of the presented development tools will be available in the near future
- Support platform for a variety of devices: netbooks, pocketables, in-vehicle, connected TV and smartphones

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Resources

- http://maemo.org/

- http://maemo.org/development/

- http://garage.maemo.org/

- http://meego.com/

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Conclusion

- **Understanding and developing applications for maemo platform**
- **Platform that is getting more and more popular, providing interesting environment for mobile application development**
- **It still getting improved and supported by Nokia and the open source community**
- **The latest big news:**
  - **Release of maemo 5 and Nokia N900 device**
  - **Merge(Maemo, Moblin) = Meego...**
- **See you in the demos session**
  - *Evolution of maemo platform*

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Thank you!

Question and discussions